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Image Based Static Hand Gesture Recognition As User Input Using Self Organizing Maps

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APPROVAL

IMAGE BASED

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AS

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Abstract

Gesture interaction is one of the aspects of HCI that has gathered a lot of attention in the recent years. Apart from the mouse, no significant HCI technologies have garnered attention in the consumer market. Gesture in humans for example are movements or symbols that are made by using any part of the human body that acts as way of communication. This project is focusing on the development of a symbolic hand gesture recognition prototype based the shape of the hand using Neural Network by means of the Kohonen's Self Organizing Map (SOM) to be used as computer input. For this project, several sets of hand gestures are collected from different people. The images are preprocessed by scaling, cleaning and converting into a format that is easy to be input into the neural network, namely binary. In the neural network design, each of the bits that represents the image will be input into the SOM network. The SOM method of identification is by reducing the dimensions of inputs and grouping similar patterns together. Therefore, by adjusting the weights of each neuron path, the images used to train the network will group into similar pattern groups. Testing is then done by inputting a different set of images from the trained images and identify whether the correct gesture is identified. After the identification, commands to the Windows console are executed according to the recognized image that is associated with the gesture. In the preprocessing side, the system has proven to normalize images quickly and accurately. However, in the SOM Network, with the lack of trained images, the accuracy rate of the system is at most 25%, with variable results on each training. Nonetheless, since the system is using a viable and tested Kohonen engine, the system can be improved with a more extensive collection of images for training. Moreover, albeit the lack of accuracy, each of the programs associated with the gestures are executed flawlessly.

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